

EDUCATION	
Baltimore, MD 06.09 - 02.14	<b>The Johns Hopkins University</b> <i>PhD in Computer Science</i> Thesis: Augmentation of Human Skill In Microsurgery Developed a microsurgical system that incorporates new robotic manipulators, intra-ocular sensing devices, and visualization techniques to address the extreme challenges of vitreoretinal surgery. Laboratory for Computational Sensing and Robotics (LCSR). Advisor: Dr. Russell H. Taylor
06.06 - 05.09	<i>MSc in Computer Science</i> Thesis: OCT-based Dynamic Virtual Fixtures for Robot-Assisted Retinal Surgery Computer Integrated Interventional Systems Laboratory. Advisor: Dr. Russell H. Taylor
New York, NY 09.01 - 05.04	<b>The Cooper Union for the Advancement of Science and Art</b> <i>Master of Mechanical Engineering</i> , Recipient of full-tuition scholarship. Thesis: Robot Control and Communication Interface for the Telerobotic Theater Designed and implemented mobile robot control and communication protocol. Co-developed a multimedia theater space for telerobotic multidisciplinary productions (\$100K budget).
09.97 -05.01	<i>Bachelor of Science in Engineering</i> , Recipient of a four-year, full-tuition scholarship. Interdisciplinary Engineering Major - Dean's List 99-01, Nicholas M. Stefano Prize
06.00 - 08.00 Prague, Czech Republic	<b>University of Pennsylvania - Penn-In-Prague Summer Program</b> Charles University in Prague Studies focused on Central European Culture and Czech Language
EXPERIENCE	
02.13 - Present Baltimore, MD	<b>Laboratory for Computational Sensing and Robotics - Postdoctoral Fellow</b> Continued PhD related projects including fluorescence-enhanced imaging of the retina, intraocular force sensing, and virtual fixtures for bimanual robot control.
11.12 - Present New York, NY	<b>ConduitProjects Inc. - Robotics Consultant/Developer</b> Sample project: designed a 6DOF, real-time, self-localization system; and a corresponding augmented reality tactical training application using the Oculus Rift headset and OpenSceneGraph toolkit.
6.07 - 09.07 Munich, Germany	<b>Institute of Micro Technology and Medical Device Technology - Visiting Researcher</b> Developed a stand-alone actuation and control unit for the da Vinci Surgical System's EndoWrist instruments. Funded by NSF International Research and Education Program for early-career researchers.
10.03 - 05.06 New York, NY	<b>NYU School of Medicine, Laboratory for Minimally-Invasive Surgery - Research Engineer</b> Developed Computer Assisted Surgery systems for minimally-invasive orthopedic procedures including tool navigation/tracking methods, anatomical modeling, and computer interfaces.(PI: Dr. Peter Walker).
New York, NY 01.04 - 05.06	<b>The Cooper Union for the Advancement of Science and Art - Adjunct Instructor</b> <i>ME 155: Design and Prototyping / Design and Prototyping Laboratory</i> Co-created and co-instructed a sophomore level mechanical engineering course. The topics included hand tools, simple machining, casting, materials, fasteners, solid modeling, 3D digitizing, rapid prototyping and computer interfacing. Designed and outfitted a complementary Lab.
Fall '02	<i>EID 101A: Guided Design</i> Instructed an introductory course for freshman engineers to familiarize students with the process of design and synthesis, emphasizing oral and visual communication. The design topic centered on improving New York City's residential solid waste disposal infrastructure.
09.01 - 05.05	<i>EID 101B: Engineering Graphics / EID 110: Engineering Design Graphics</i> Instructed descriptive geometry, drafting and presentation techniques to freshmen engineering students. Advanced course included 3D modeling, rendering, and AutoCAD LISP language ('05).
02.03 - 07.03 Albi, FRANCE	<b>L'Ecole des Mines d'Albi - Carmaux - Researcher</b> Researched methods for predicting compaction parameters in a roll press for pharmaceutical powders. Created Matlab application with database and GUI based on Johanson model to investigate the general process. Examined alternative numerical approaches.
06.02 - 02.03 New York, NY	<b>Hoberman Designs Inc. - Project Engineer / Toy Designer</b> Programmed servo motor controller and touch panel for Hoberman Icosahedron (17'Dia) sculptures. Designed and prototyped plastic toy mechanisms for various Hoberman toys. Integrated microcontrollers, sensors, wireless transceivers, MIDI technology and audio synthesizer for a music toy prototype: Sonic FX based on the Hoberman Sphere.
04.01 - 06.01 New York, NY	<b>Whitney Museum of American Art - Data Dynamics - Technical Support</b> Provided technical support for interactive digital exhibitions. Web administrator for Camouflagetown.tv installation, including Real streaming server for real time A/V web casts.
SKILLS	
<p><b>Engineering:</b> Electro-mechanical Design, Software Engineering, Robotics, CAD/CAM.  <b>Prototyping:</b> 3D Printing, Machining (CNC), Casting, Actuators, Sensors, Microcontrollers.  <b>Computer Science:</b> C/C++, Python, Java, Databases, OpenGL, QT, VTK, Matlab, Image Processing, Computer Vision, Augmented Reality, Parallel Processing, Networking, Linux, Windows, OS X, RT OS.</p>	

SCHOLARSHIPS	
2008-11	<b>ARCS Foundation Scholar</b>
Baltimore, MD	<i>Achievement Rewards for College Scientists Foundation - Metro Washington Chapter</i>
2009	<b>NSF GRASSROOTS Fellow</b>
Kobe, Japan	<i>Travel grant to encourage future research collaborations in Japan</i>
2001	<b>Two Year Full Tuition Graduate Degree Scholarship</b>
New York, NY	<i>The Cooper Union</i>
1997	<b>Four Year Full Tuition Undergraduate Degree Scholarship</b>
New York, NY	<i>The Cooper Union</i>
PUBLICATIONS	
February 2013	<b>"Auditory Force Feedback Substitution Improves Surgical Precision During Simulated Ophthalmic Surgery"</b> Nathan Cutler, Marcin Balicki, Mark Finkelstein, Jiangxia Wang, Peter Gehlbach, John McGready, Iulian Iordachita, Russell Taylor, James T. Handa; <i>Journal of Investigative Ophthalmology &amp; Visual Science</i>
September 2012	<b>"Interactive OCT Annotation and Visualization for Vitreoretinal Surgery"</b> Marcin Balicki, Rogerio Richa, Balazs Vagvolgyi, Peter Kazanzides, Peter Gehlbach, James Handa, Jin Kang, Russell Taylor; <i>Proceedings of Augmented Environments for Computer-Assisted Interventions (AE-CAI-2012), LNCS 7815, pp. 142--152. 2013</i> <b>* Best Poster Award</b>
October 2012	<b>"Preliminary Evaluation of a Micro-Force Sensing Handheld Robot for Vitreoretinal Surgery"</b> Berk Gonenc, Marcin Balicki, James Handa, Peter Gehlbach, Cameron Riviere, Russell H. Taylor, Iulian Iordachita; <i>Proceedings of IEEE/RSJ IROS 2012</i> .
August 2012	<b>"Vision-based Proximity Detection in Retinal Surgery"</b> Rogerio Richa, Marcin Balicki, Raphael Sznitman, Eric Meisner, Russell Taylor, Gregory Hager; <i>IEEE Transactions on Biomedical Engineering Journal</i>
January 2012	<b>"A Force-sensing Microsurgical Instrument That Detects Forces Below Human Tactile Sensation"</b> Sarah Sunshine, Marcin Balicki, Xingchi He, Kevin Olds, Jin Kang, Peter Gehlbach, Russell Taylor, Iulian Iordachita, James T. Handa; <i>Retina Journal</i>
January 2011	<b>"Towards Automatic Online Calibration of Fourier-Domain OCT for Robot-Assisted Vitreoretinal Surgery"</b> Xuan Liu, Marcin Balicki, Russell H. Taylor, and Jin U. Kang; <i>Optics Express Journal 2010. Also appeared in Virtual Journal for Biomedical Optics V.6, I.1, 1/2011.</i>
September 2010	<b>"Micro-Force Sensing in Robot Assisted Membrane Peeling for Vitreoretinal Surgery"</b> Marcin Balicki, Ali Uneri, Iulian Iordachita, James Handa, Peter Gehlbach, Russell Taylor; <i>Proceedings of the MICCAI Conference.</i> <b>* Runner-up for Best Paper in Computer Assisted Intervention Systems and Medical Robotics</b>
September 2010	<b>"New Steady-Hand Eye Robot with Micro-Force Sensing for Vitreoretinal Surgery"</b> Ali Uneri, Marcin A. Balicki, James Handa, Peter Gehlbach, Russell H. Taylor, and Iulian Iordachita; <i>Proceedings of the BIOROB Conference.</i>
September 2009	<b>"Single Fiber Optical Coherence Tomography Microsurgical Instruments for Computer and Robot-Assisted Retinal Surgery"</b> Marcin Balicki, Jae-Ho Han, Iulian Iordachita, Peter Gehlbach, James Handa, Russell Taylor, Jin Kang; <i>Proceedings of the MICCAI Conference (Oral Presentation, 5% acceptance rate).</i> <b>* Best Paper Award in Computer Assisted Intervention Systems and Medical Robotics</b> <b>* Runner-up for Young Scientist Award in Computer-assisted Intervention: Simulation and Robotics.</b>
May 2009	<b>"Development and Preliminary Data of Novel Integrated Optical Micro-Force Sensing Tools for Retinal Microsurgery"</b> Zhenglong Sun, Marcin Balicki, Jin Kang, James Handa, Russell Taylor, Iulian Iordachita; <i>Proceedings of IEEE ICRA Conference. Presentation.</i>
April 2009	<b>"A Sub-Millimetric, 0.25 mN Resolution Fully Integrated Fiber-Optic Force Sensing Tool for Retinal Microsurgery"</b> Iulian Iordachita, Zhenglong Sun, Marcin Balicki, Jin Kang, Soo Jay Phee, James Handa, Peter Gehlbach, Russell Taylor; <i>Journal of Computer Assisted Radiology and Surgery</i>
September 2008	<b>"Cooperative Robot Assistant for Retinal Microsurgery"</b> Fleming I., Balicki M., Koo J., Iordachita I., Mitchell B., Handa J., Hager G and Taylor R.; <i>Proceedings of the MICCAI Conference. Poster</i>
June 2007	<b>"Development and Evaluation of an Instrumented Linkage System for Total Knee Surgery"</b> Peter S Walker, PHD; Chih-Shing Wei, PHD; Rachel E Forman, MSE; M A Balicki, MSE; <i>Journal of Clinical Orthopaedics and Related Research</i>
February 2007	<b>"Application of Instrumented Linkage for TKR Surgery"</b> Forman RF, Balicki MA, Walker PS, Wei CS, Klein GR; Textbook Chapter in <i>Navigation and MIS in Orthopedic Surgery</i> by Stiehl, James B. (Ed.) (pp.592-598) Heidelberg: Springer, 2007
February 2007	<b>"Use of Oximetry-capable Instruments for The Differentiation of Vascular And Non-vascular Structures During Laparoscopy"</b> Meireles, O R; Hanly, E J; Assumpcao, L R; Akinbiyi, T; Balicki, M A; Fischer, G S; Saha, S; Shih, S; Taylor, R H; Talamini, T M; Marohn, M R; - <i>Proceedings of the SAGES Conference. Poster</i>

PUBLICATIONS	CONTINUED
June 2006	<b>"A Navigated Drill Guide Using an Instrumented Linkage for the Placement of Cutting Jigs During Total Knee Arthroplasty"</b> Balicki, M A; Forman, R E; Walker, P S; Wei C-S; White, B; Roth, J; Klein, G R; <i>Proceedings of the European Orthopaedic Research Society Conference.</i> Talk
March 2006	<b>"A Navigated Drill Guide Using an Instrumented Linkage for the Placement of Cutting Jigs During Total Knee Arthroplasty"</b> Balicki, M A; Forman, R E; Walker, P S; Wei C-S; White, B; Roth, J; Klein, G R; <i>Proceedings of the Orthopaedic Research Society Conference.</i> Poster
June 2004	<b>"Accuracy of Freehand Cutting in Simulated Total Knee Surgery"</b> Iesaka, K; Walker, P S; Forman, R E; Kim, D E; Patel, Y G; Wei, C-S, Balicki, M A; <i>Proceedings of the Computer Assisted Orthopaedic Surgery Conference.</i> Poster
PATENTS	(Inventors omitted for brevity)
Pending, Filed 2011	<b>"Automatic calibration of fourier-domain optical coherence tomography systems"</b> PCT/US2011/046290
Pending, Filed 2011	<b>"Tool exchange interface and control algorithm for cooperative surgical robots"</b> PCT/US2011/046268
Pending, Filed 2011	<b>"Method for presenting force sensor information using cooperative robot control and audio feedback"</b> PCT/US2011/046276
Pending, Filed 2011	<b>"Micro-force guided cooperative control for surgical manipulation of delicate tissue"</b> PCT/US2011/046278
Pending, Filed 2011	<b>"Autofocusing endoscope and system"</b> PCT/US2011/046242
Pending, Filed 2010	<b>"Visual tracking and annotation of clinically important anatomical landmarks for surgical interventions"</b> PCT/US2010/054988
Pending, Filed 2010	<b>"Surgical Instrument and Systems with Integrated Optical Sensor"</b> US 12/917,168
Pending, Filed 2008	<b>"System and components for tracking surgical items"</b> PCT/US2008/006863
ACTIVITIES	
10.10 Washington DC	<b>USA Science and Engineering Festival - Presenter</b> Created a hands-on medical robotics tele-operation demo. Represented The Johns Hopkins University and the ARCS Foundation.
09.09 Monpellier,France	<b>European Surgical Robotics Summer School</b> Week long program with lab visits, tutorials and seminars led by expert researchers and industry representatives in surgery and robotics.
07.09 Washington DC	<b>NSF Cyber Physical Systems Research Expo</b> Presented latest microsurgery research to the members of the US Congress and their support staff.
01.09 Baltimore, MD	<b>The Johns Hopkins University - Winter School for Medical Robotics and Computer-Integrated Interventional Systems</b> Week long program with seminars led by expert researchers and industry representatives in computer integrated surgery and robotics.
09.04 - 05.06 New York, NY	<b>New York University - Preceptor</b> <i>Natural Science 1: Human Body: The Ultimate Machine</i> Instructed laboratory section of the course. Prepared course materials, lectured, etc.
09.99 - present New York, NY	<b>The Cooper Union - Teacher's Assistant</b> <i>EID101 Engineering Graphics, EID110 Advanced Graphics, EID160 Acoustics, ME425 Product Design</i> Prepared lecture materials, lectured, and managed industry sponsored class projects.
09.05 Benicàssim, Spain	<b>Universitat Jaume I - Summer School on Robotics and Neuroscience</b> Week long program with lectures from leading world experts in neuroscience and robotics.
09.00 - 06.02 New York, NY	<b>The Cooper Union Forrest Wade Rapid Prototyping Lab - Manager</b> Managed 3D printer, 3D scanner, Phantom haptic device, and CATIA/SolidWorks CAD stations.
09.01 - 06.02 New York, NY	<b>Ad Quadratum - Descriptive Geometry Illustrator</b> Responsible for illustrating a book by Professor Jean Le Mee (Chair of Mechanical Engineering at Cooper Union) which is a study of ad quadratum method for generating the platonic polyhedra.
04.02 New York, NY	<b>Martha Stewart Network Show - feature on Cooper Union</b> Presented the development of StudioBlue - Telerobotic Theater.
11.01 New York, NY	<b>Art and Science Collaboration, Inc. - Symposium.</b> Guest presenter of collaborative work on <i>Camouflagetown</i> telerobotic exhibit at the Whitney Museum.
06.01 - 09.01 New York, NY	<b>Eva Zeisel - Apprentice</b> Worked closely with well-known industrial designer on compact contemporary furniture design for city living. Gained design process and wood shop experience.
06.01 - 09.01 Brooklyn, NY	<b>Loft Interior Design and Construction</b> Designed and built a bi-level interior of a loft in an industrial area of Brooklyn.

ACTIVITIES	COLLEGIATE
Johns Hopkins University	Board Member of Computer Integrated Surgery Student Research Society ('07-'09), Intramural Intermediate Squash League Champion ('08), Intramural Soccer League Champion ('07-'09), GRO Summer Co-ed Soccer League Champion ('08-'09)
Cooper Union	Student Council: Judicial and Academic Standards Committees, Treasurer ('99-'00); Zeta Psi Fraternity (President '01), Founder of Polish Club (President '99), New York City Experience Club (President '98), Athletic Association ('00), Robotics Club. ASME Member ('04-'05). Varsity Soccer Team (Captain '97-'00), Varsity Volleyball Team ('98).
EXHIBITIONS	
10.04 Queens, NY	<p><b>JFK Airport - TWA "Terminal 5" Art Exhibit : "Here's Looking at You" (LineUp Collaboration)</b></p> <p>An art installation that presents the contemporary challenge involving surveillance in public spaces. Integrated video capture, flash, bill collector and digital printing in a photo booth.</p>
06.02 New York, NY	<p><b>Cooper Union End of Year Student Exhibition</b></p> <p><i>Electromechanical Avatars</i> - A surveillance-themed installation using research robots with obstacle avoidance in a free-roaming environment. The semi-autonomous PeopleBot was controlled by visitors from a remote location in exhibition building. Multiple cameras and monitors were positioned to complement the supervisory nature of the robots. (Collaboration with James Cruickshanks)</p> <p><i>An Acoustic Illusion</i> - An acoustic reproduction of Astor Place Subway stop in the Foundation Building. An array of high-power, high-fidelity loudspeakers hidden in the ceiling periodically reproduced an audio recording of trains arriving and departing to create an illusion of an active subway station. (Team project under the direction of Prof. Jim Abbott)</p>
04.02 New York, NY	<p><b>Cooper Union's Foundation Building Rededication Ceremony</b></p> <p>Teleoperated robot cut the ceremonial ribbon in the company of elected officials. Modified PeopleBot's arm accessory to accept a conventional scissor. (Collaboration with James Cruickshanks)</p>
03.01 - 06.01 New York, NY	<p><b>Camouflagetown.tv -Whitney Museum of American Art (Senior Project - Cooper Union)</b> <b>Artist: Adrienne Wortzel</b></p> <p>A theatrical telerobotic installation which lived in the museum for the Data Dynamics exhibition. Kiru the robot, walked and talked autonomously, except when remotely controlled from the World Wide Web. Kiru interacted with visitors and commented on thematic issues of the work presented.</p> <p>Contributions: Served as the liaison between the artist and engineering teams. Managed the integration of robotic technologies, web services, WiFi, wireless A/V technologies and A/V real-time webcasts, as well as artistic elements.</p>